

Integrating Diamond Beam Monitors into XAS Experiments

Scientific Achievement

Integrated diamond-based beam monitors in x-ray absorption experiments using a polycapillary lens tapered at one end

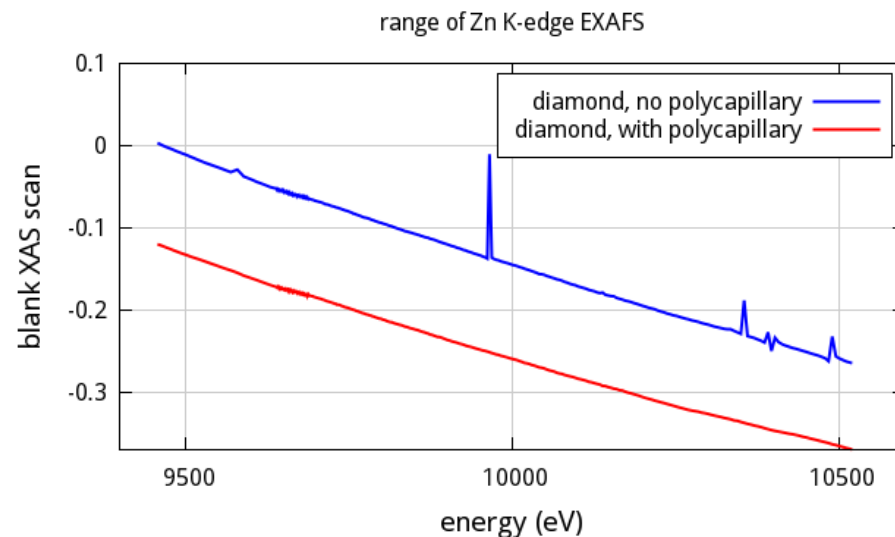
Significance and Impact

Diamond sensors perform better than conventional ionization chambers but had previously been difficult to use in XAS; this study remedies that issue

Research Details

- XAS experiments always involve scanning over a broad energy range.
- To monitor the beam, ionization chambers are typically used, although single-crystal diamond sensors offer faster response times, less leakage current, and are more compact.
- However, when using a diamond sensor, the scan includes energies at which the beam diffracts from the diamond, necessitating a lot of post-processing to the data.
- Coupling the diamond sensor with a half polycapillary lens “blurs” the beam so that the diffraction effect is far less pronounced.

Work was performed at Brookhaven National Laboratory



Two blank XAS scans over energy ranges that are typical of XAS experiments. With unfocused beam (blue), several glitches from the diamond sensor are clearly visible. With the beam first passing through the polycapillary lens, the glitches are eliminated.

B Ravel, K Attenkofer, J Bohon, E Muller, J Smedley, *Review of Scientific Instruments* **84**, 103106 (2013)



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